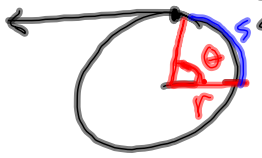
63.



$\frac{ds}{dt} = 6$ ft/sec truck

$s = r\theta = 1.2\theta$

r is constant

find how fast in rad/sec the spool turns when $r = 1.2$

find $\frac{d\theta}{dt}$

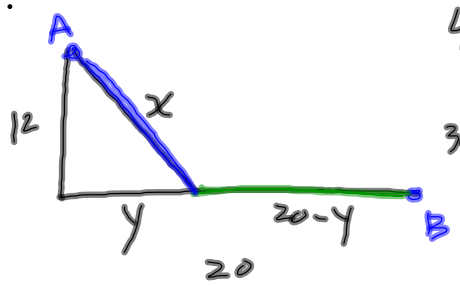
$\frac{ds}{dt} = 1.2\frac{d\theta}{dt}$

$6 = 1.2\frac{d\theta}{dt}$

$\frac{d\theta}{dt} = \frac{6}{1.2} = 5 \frac{\text{rad}}{\text{sec}}$

Nov 4-7:18 AM

53.



40,000 $/mi water

30,000 $/mi land

what if $y = 5$? $x = \sqrt{12^2 + 5^2} = 13$

land: $15 \text{ mi} \cdot 30{,}000 \frac{\$}{\text{mi}} = 450{,}000$ $(20-y)$

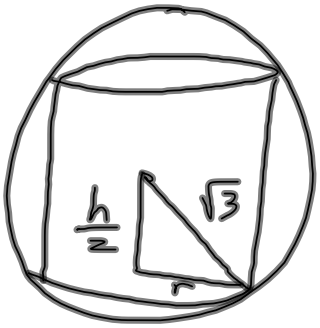
water: $13 \text{ mi} \cdot 40{,}000 \frac{\$}{\text{mi}} = 520{,}000$ $\sqrt{12^2+y^2}$

total cost 970,000

$C = (20-y)\cdot 30{,}000 + \sqrt{12^2+y^2}\cdot 40{,}000$

Nov 4-8:00 AM

49.



$\max \; V = \pi r^2 h$

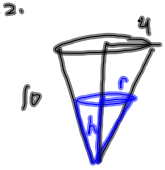
$3 = \left(\frac{h}{2}\right)^2 + r^2$

$r^2 = 3 - \frac{h^2}{4}$

$V = \pi\left(3 - \frac{h^2}{4}\right)h$

Nov 4-11:51 AM

62.



Variables r, h, V

rates $\frac{dV}{dt} = -5$

$\frac{dh}{dt} =$ find

a) $\frac{4}{10} = \frac{r}{h}$; $r = \frac{2}{5}h$

b) $V = \frac{\pi}{3}r^2 h$

$r = \frac{2}{5}h$

$V = \frac{\pi}{3}\left(\frac{2}{5}h\right)^2 h$

$V = \frac{4\pi}{75}h^3$

$\frac{dV}{dt} = \frac{4\pi}{75} \cdot 3h^2 \frac{dh}{dt}$

$-5 = \frac{4\pi}{75} \cdot 3 \cdot 6^2 \frac{dh}{dt}$

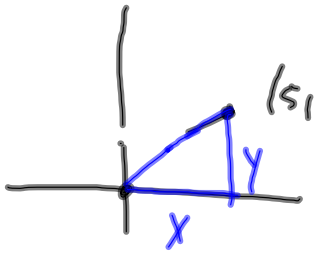
$\frac{dh}{dt} = \frac{-5}{4\pi} \cdot \frac{75}{3 \cdot 6^2} \approx$

Nov 4-8:29 AM

59. $\frac{dx}{dt} = -1 \frac{m}{s}$ $\frac{dy}{dt} = -5 \frac{m}{s}$

How fast approaching origin at (5,12)

find $\frac{dD}{dt}$



(5, 12) variables x, y, D

$x^2 + y^2 = D^2$

$2x\frac{dx}{dt} + 2y\frac{dy}{dt} = 2D\frac{dD}{dt}$

$5 \cdot (-1) + 12(-5) = 13\frac{dD}{dt}$

$\frac{dD}{dt} = \frac{-5-60}{13} = -5$

Nov 4-8:46 AM